



**US Army Corps
of Engineers®**

United States Army Corps of Engineers

TriServices BIM Standards, Datasets and Configuration for Bentley Building Applications

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Definitions

In the context of this document, the following key terms are defined as follows:

- Building Models** A combination of graphic elements that represent the actual building being designed by the architect. Building Models can be stored in separate Model Containers.
- Floors** Special reference planes that designate the individual stories of a building
- Model Container** A discrete object in a design file that contains MicroStation, TriForma, and Bentley Architecture elements. Multiple Model Containers can be stored in a single design file. Model Containers can be either 2D or 3D.
- Reference Plane** an infinite plane that is used to create an Auxiliary Coordinate System in Project design files
- Storey** The vertical level in a building that defines where in the Z axis a Floor Plan will be drawn. Stories are always horizontal – they are never sloped.

Requirements and Notes

Introduction

Overview

This document is intended to provide instructions on how to install the Tri-Services Building Information Modeling (BIM) standards, dataset and centralized workspace downloaded for use with the Bentley Building Applications. It will also provide the necessary instructions on how the centralized workspace can be modified to accommodate your individual network environment and users and will discuss the logic surrounding its design. The standards and dataset supplied complies with the current Tri-Service CADD Standard.

The standards, dataset and centralized workspace as well as any concepts presented in this document are not intended to be definitive and all inclusive. They represent the current state of integration and adoption in the BIM process. The USACE CAD/BIM Technology Center and Bentley are open to suggestion, comments and feedback for the betterment and advancement of the BIM process. As you will see, the CAD/BIM Technology Center has provided many places in the performance of BIM work to enrich the BIM standards, content and/or process and hope all recipients of this document can be productive contributors. Please direct any formal feedback or questions concerning these standards, dataset and centralized workspace to david.m.johnson1@us.army.mil.

Contents

This compressed file contains data which is designed for and intended to be used in the design of United States Army Corp Engineers projects and is made available to USACE personnel and Architectural/Engineering firms under contract by USACE in preparation of a Building Information Model (BIM).

The recipient and user of this data should understand that this data is not considered static or comprehensive for all designs and/or facility types. It will be maintained in a continuous state of development in order to accommodate the evolution of standards, content and technology for future U. S. Army Corps of Engineers BIM projects.

The contents of this compressed file (Version 07Q3) are compatible with the following Bentley Building applications:

Required:

MicroStation V8 XM Prerequisite Pack	01_mssp08090401en
MicroStation V8 XM	02_ms08090451en
At least one of the discipline specific applications listed below is required	
Bentley Building Structural V8 XM	03_stf08090439en
Bentley Building Architecture V8 XM	04_arc08090433en
Bentley Building Mechanical Systems V8 XM	05_msys08090445en
Bentley Building Electrical V8 XM	06_bes08090410en
ProjectWise Navigator XM	07_nav08090460en

The dataset and centralized workspace provided in this compressed file depends on the installation of these products, but does not include them or any Bentley products or licenses. It is the responsibility of the user to have the required software installed on the workstations which are to be used with this dataset and administration for installing, configuring and running the software. If you have any questions concerning these products, please contact Bentley Systems Incorporated. Bentley Select Subscribers can download these applications from <http://selectservices.bentley.com/en-US/Support/Downloads+And+Updates/>

Overview

The Tri-Services configuration has been designed to assist the USACE districts and the AE community in the adoption of the BIM process. In designing the Tri-Services centralized workspace, the following items became criteria in its development.

Centralized Workspace Criteria

“Picture in Time”

The Tri-Services corporate BIM dataset has been incorporated into the Project directory structure to maintain the connection between the project data and the data used to create the project. This allows the project to carry its dataset as a ‘Picture in time’. As each project is contracted it can be assigned a standard and that standard can be maintained throughout the project. This will allow new projects to continually adopt the latest corporate standard, perpetually moving the BIM process forward with each project and advancement in the standards. This also provides for the opportunity to adopt the latest software versions and advancements.

Corporate and Project Dataset

Each project dataset is linked to the corporate dataset and is also linked to an empty project dataset. The project dataset serves several goals. 1) It allows users to add content to the project that is not captured in the corporate dataset, It provides a structure storage container for supplementary files required to reproduce the project. It also allows the user to propose change or enhancement to BIM content. 2) It provides an identifiable container for the Tri-Services BIM administrators to review for additional content and enhancement to be added to the Tri-Services corporate dataset.

AE Flexibility

The CAD/BIM Technology Center understands that many of the AE firms have greatly invested in the customization of their software to enhance production and map workflows. That is why it was very important that the CAD/BIM Technology Center provided a centralized workspace that should not interfere with any of AE customization. The Tri-Services centralized workspace does not alter any of the files on the local workstation and uses only a series of shortcuts to access their networked base configuration. This centralized configurations should allow firms great flexibility for personnel to participate on a Tri-Services project while mapping directly to the provide standards. AE firms can be operational in an environment similar to that found in a USACE district office in a very short time.

Multi-Disciplined

The Tri-Services configuration supports multi-discipline environments. It allows for the operation of Bentley Architecture, Bentley Structural, Bentley Building Mechanical Systems (BBMS) and Bentley Building Electrical Systems (BBES). It allows for the operation of all the application either to run together or in any combination of the four applications such as Architecture and Structural or Structural and Mechanical. The configuration is also tied to your users’ default discipline. For example, if architects log in, they are automatically assigned the architectural standards. However, understanding that multi discipline firms may have user that might want to look at information from a different perspective, the users have the option to override their default and may view Structural information through the structural application as though they were a structural user.

The CAD/BIM Technology Center solicited comments from associated districts and several of their AE firm under contracts after the initial development of the Tri-Services centralized workspace and has received positive responses.

Overview

All USACE standards, datasets and centralized workspaces are installed on a local area network storage device. There are no storage requirements for individual workstations or local hard drives, however workstations must have access to the LAN storage device and must be able to access this data via shortcuts. The Tri-Services configuration should not affect any current configurations and/or customization of Bentley applications since it resides separately in an external directory structure.

To install the Tri-Services standards, dataset and central workspace you will have to perform the following task:

- Unzip the compressed file containing the workspace and the project files.
- Identify a destination for the **TS_Workspaces** workspace on your server, this will require approximately 411MB.
- Copy workspace contents to the server (under the *Workspace_Drive* folder).
- Identify a destination for the Tri-Services projects on your server, the base template requires approximately 100MB.
- Copy project contents to the server (under the *Project_Drive* folder).
- Modify the configuration files to correspond to your workspace and project destination.
- Select Licensing method.
- Create shortcuts (specific to your configuration).
- Creating user(s).
- Create Project(s).
- Test

Server Installation

To install the Tri-Service standards, dataset and central workspace you will have to perform the following task:

Download the Workspace:

- Download the workspace from the internet:
 - <https://cadbim.usace.army.mil/>
 - Under the **Links**, Click the Software Downloads Folder and then the Dataset Folder
 - Select the **USACE Dataset ReadMe 07Q3 File Link**
- At end of the document is a link for download registration (**Download Dataset**).
- Complete the registration information file.

Installing the Workspace:

- Identify a destination for the TS_Workspace on your server; this will require approximately 411MB.
- Move TS_Workspace to the server
- The destination drive and directory you select will be referred to as the *<workspace_destination>*, When editing the configuration files use your actual drive and directory mapping in replace of this nomenclature. i.e. if you installed the TS_Workspace on **H:\corps\ TS_Workspace**, then your *<workspace_destination>* is **H:\corps**

Installing the Project

- Identify a destination for the Tri-Services projects on your server, the base template requires approximately 100MB choose a destination that has plenty of space to accommodate the bulk of the project files.



Note: workspace and projects directory can either be on separate network drives or be collocated on the same drive. For the default configuration, the Project Drive is labeled “P” and the Network Drive is labeled “N” in the installed Dataset shortcuts.

- Copy project contents to the server. The Project directory contains a template project with a sample directory structure and a full version of the USACE BIM dataset. This template is required to successfully test your installation. To create your official USACE project, it is recommended that you make a copy of the template project a rename it to your assign project name.
- The destination drive and directory you select for the Project_Drive will be referred to as the *<project_destination>*, When editing the configuration files use your actual drive and directory mapping in replace of this nomenclature. i.e. if you installed the Project_Drive on P:\Projects\, then your *<project_destination>* is P:\

Modify the configuration

Modification of the configuration files to correspond to your workspace and project destination can be done with a standard text editor such as notepad. Do not use a formatted text editor such as Word. There are three files that are required to be edited to connect the USACE configuration to the workspace and project destinations selected above.

Editing the USACE_mslocal.cfg: Settings for MicroStation

Using Notepad open the file **USACE_mslocal.cfg** found in the following directory
<workspace_destination>\TS_Workspaces\USACE_Dataset_07Q3\Program\MicroStation\config\

Set the **USACE_Site** variable to read as follows, substituting the *<workspace_destination>* for your actual drive and directory mappings

```
USACE_Site = <workspace_destination>/TS_Workspaces /USACE_Dataset_07Q3/ #Network  
Location for Corporate Workspace
```

Note: UNC paths are also acceptable

```
i.e. USACE_Site = \\<server>/TS_Workspaces /USACE_Dataset_07Q3/  
#Network Location for Corporate Workspace
```

Editing the USACE_tflocal.cfg: Settings for Triforma

Using Notepad open the file **USACE_tflocal.cfg** found in the following directory
<workspace_destination>\TS_Workspaces\USACE_Dataset_07Q3\Program\Triforma\config\

Set the **USACE_Site** variable to read as follows, substituting the *<workspace_destination>* for your actual drive and directory mappings

```
USACE_Site = <workspace_destination>/TS_Workspaces /USACE_Dataset_07Q3/ #Network  
Location for Corporate Workspace
```

Note: UNC paths are also acceptable, but not recommended

```
i.e. USACE_Site = \\<server>/TS_Workspaces /USACE_Dataset_07Q3/  
#Network Location for Corporate Workspace
```

Editing the USACE_01_Server.cfg: Settings for projects

Using Notepad open the file **USACE_01_Server.cfg** found in the following directory
<workspace_destination>\TS_Workspaces\USACE_Dataset_07Q3\Workspace\Standards

Set the **USACE_ProjectDir** variable to read as follows, substituting the *<project_destination>* for your actual drive and directory mappings

```
USACE_ProjectDir = <project_destination>/Projects
```

It is recommended that the *<project_destination>* is to be a mapped drive destination and not a UNC path.

Select Licensing method

Using Bentley SELECTserver (Default)

The default USACE centralized workspace accommodates centralized license files and is designed to access a Bentley SELECTserver. You can use centralized licensing by either

- copy your **msv8.lic** to the *<workspace_destination>*
>*ITS_Workspaces\USACE_Dataset_07Q3\Program\Licensing*

OR

- create a file called **msv8.lic** and “point” to the computer name that SELECTserver is currently running on. In the license file you created, add the following line:

```
SERVER="YourServerName" (NOTE: Always end this with a Return character)
```

SERVER must be written in uppercase letters. **DO NOT** use a “#” or “;” or “\” in the server name.

If, when launching a client, you receive a message about not being able to resolve the server's IP address, or if it is being resolved to a value different than you want, you can add the following additional tag to this line to force a specific IP address:

```
SERVER="YourServerName" IPADDRESS="#.#.#" (NOTE: Always end this with a Return character)
```

More information regarding setting up a client license can be found in Bentley's SELECTserver's documentation.

Using a local or node licensing model

The USACE centralized workspace can be edited to accommodate a local or node licensing model. Using notepad.exe open the file **USACE_01_Server.cfg** found in the following directory:

```
<workspace_destination>ITS_Workspaces\USACE_Dataset_07Q3\Workspace\Standards\
```

Comment out the line beginning with the expression `_USTN_LICENSING` by adding a “#” in front of the expression as displayed below.

```
%if defined (USACE_Site)
#_USTN_LICENSING =$(USACE_Site)Program\Licensing/
  _USTN_HOMEROOT = $(USACE_Site)Home/
%endif
```

Be sure to save your changes. This will force the application to search locally (by default, *C:\Program Files\Bentley\Program\Licensing*) for the license file.

Create shortcuts

In the Dataset that is extracted under `<workspace_destination>\ITS_WORKSPACES\USACE_Dataset_07Q3`, there is a directory labeled “*Bentley Shortcuts*”, Inside this directory is a directory label “*USACE Bentley Building*”. This is a collections shortcuts

- a. Copy the “USACE Shortcuts” folder from the Shortcuts Dataset to your desktop and open the properties of each of the TriForma Tools Icons within that folder to edit each target location.
 - i. Replace the Target for USACE MicroStation icon to: "C:\Program Files\Bentley\Program\MicroStation\ustation.exe" -wc"<Workspace Destination>\Program\Microstation\config\USACE_mslocal.cfg"
 - ii. Replace the Target for USACE Bentley Architecture icon to: "C:\Program Files\Bentley\Program\MicroStation\ustation.exe" -wc"Corporate Drive:\Corps\8files\USACE_Dataset_07Q3\Program\Triforma\config\USACE_atflocal.cfg"
 - iii. Replace the Target for USACE Bentley Structural icon to: "C:\Program Files\Bentley\Program\MicroStation\ustation.exe" -wc"<Workspace Destination>\Program\Triforma\config\USACE_stflocal.cfg"
 - iv. Replace the Target for USACE Bentley Mechanical icon to: "C:\Program Files\Bentley\Program\MicroStation\ustation.exe" -wc"<Workspace Destination>\Program\Triforma\config\USACE_hvaclocal.cfg"
 - v. Replace the Target for USACE Bentley Interior Architecture icon to: "C:\Program Files\Bentley\Program\MicroStation\ustation.exe" -wc"<Workspace Destination>\Program\Triforma\config\USACE_iatflocal.cfg"

You should do likewise with the icons within the subfolders “USACE Bentley Suite Options” and USACE Datagroups” if you intend to use these. Users should copy these shortcuts to their local desktops.

Creating user(s)

The Tri-Services centralized workspace is dependant on disciplines for the assignment of working directories, standards and other systems settings. The discipline is passed by a users network username to the applications. So it is important that you create a user configuration file for each team member participating in USACE projects and assign a default discipline code. Note, the default discipline code will not prevent user from accessing other discipline information or view information as if they were an alternate discipline.

To create new users:

- Open the “<workspace_destination>\ITS_Workspaces\USACE_Dataset_07Q3\Workspace\Users” folder; make a copy of the appropriate discipline configuration file (i.e. _Architecture.ucf) for the new user and put it into the same folder.
- Rename the copied configuration file to the user’s network username. (i.e. h2edgbkh.ucf). The network username should be the same username used to log onto Microsoft Operating System.

Note the discipline named .ucf file begins with an “_” (underscore) so that it remains at the top of the list alphabetically: do not include the underscore when naming your user ‘s configuration files.

Create Project(s)

Creating the project directory

The Tri-Services centralized workspace is delivered with a template project which contains the recommended directory structure for Tri-Services BIM projects and a complete BIM dataset to support the Tri-Services standards and the Bentley Building applications.

To create a new project you will need to copy the entire directory and its contents and rename the parent directory to the assigned Tri-Services project name. To access this project from the Project selection dialog in the MicroStation manager you will also need to associate a project configuration to this directory as described in the section below titled “*Creating the project configurations*”.

To create a new project:

- Make a copy the `_Template_BIM_Project_07Q3` directory and all its contents located in `<project_destination>\Projects\`
- Rename the copy to the assigned Tri-Services project name

Creating the project configurations

The Tri-Services centralized workspace is delivered with a template project and two project configurations. The two project configurations point to the same template project but changes the configuration to accommodate a different aspects of the design and documentation process. The project configurations are located in the “<workspace_destination>\ITS_Workspaces\USACE_Dataset_07Q3\Workspace\Projects” directory. In that directory there should be two project configuration files (.pcf); *_Template_BIM_Project_07Q3.pcf* and *_Template_BIM_Project_Sheets_07Q3.pcf*. The *_Template_BIM_Project_07Q3.pcf* file controls the directory structure and settings for BIM modeling while the *_Template_BIM_Project_080504_Sheets.pcf* controls the directory structure and settings for construction documentation and detailing.

To create a new project. configuration

- Make a copy of the project configuration template located in the “<workspace_destination>\ITS_Workspaces\USACE_Dataset_07Q3\Workspace\Projects” directory that **does not** have the **_Sheets** suffix.
- Rename the copy of the project configuration file (.pcf) with the assign project name. (i.e. *new_project.pcf*)
- Using notepad.exe, open the project configuration file you just created (i.e. *new_project.pcf*).
- Set the USACE_PROJECTNAME variable to equal the new project’s directory name. This name must match exactly the directory name. If you use spaces in your directory name encompassing the directory in double quotes (“”) is not necessary.

i.e. USACE_PROJECTNAME = new_project
- Set the _USTN_PROJECTDESCR variable to equal how you want the project description to read. This variable does not control any of the application functions so its content is not critical to the operation of the USACE workspace

i.e. _USTN_PROJECTDESCR = New Project
- Save your changes and close this file
- Make a copy of the project configuration file you just created
- Rename the copy to have the same name as the original but add the suffix **_Sheets**. (i.e. *new_project_Sheets.pcf*)
- Using notepad.exe or any text editor, open the project configuration file with the **_Sheets** suffix. (i.e. *new_project_Sheet.pcf*).
- Save your changes and close this file

Download Dataset:

- **Standard Dataset** Standard Bentley installation.
 - [Download](#)
- **Alternate Dataset** with revised Icon paths for those who have installed the Bentley XM software to the folder “\Program Files\BentleyXM”
 - [Download](#)

Revisions Made After Release

Date	Revision No.	Description
2007-03-15	001	Revise installation from compressed file. Update software version requirements.
2007-08-30	002	Revision for version 07Q2, Change main folder designation to TS_WORKSPACES. Revise to make standards Tri-Services.
2008-02-15	003	Revisions for 07Q3 version for XM.
2008-04-21	004	<p>New A/E/C 3.0 Standards plot driver: takes into account the colors set aside for screening by the A/E/C CAD Standard v3.0. It sets the screening as set in the Standards Table 3-4. Lineweights are set as in Table 3-1. The pen table corrects the problem with black lines placed before screened lines are hidden by the screening, by forcing black objects to the front. This pen table also does the text substitutions for the PW title block.</p> <p>Because this driver is set to use the System Printer, it will be advantageous for the CAD Manager to set up Plot configurations (INI) for their system printers. That is why I am having the MS_PLOTINI variable redirected also. I tried to keep it as generic as possible. CAD Managers can further tweak it for their own networks.</p> <ul style="list-style-type: none"> • SysPrint-AECv3.pltcfg • PDF-AECv3.pltcfg • AECv3_Screening.tbl • Locations <p>...\TS_Workspaces\USACE_Dataset_07Q3\Workspace\Standards\plotdrv\ ...\\TS_Workspaces\USACE_Dataset_07Q3\Workspace\Standards\tables\Pen\</p>
2008-04-21	005	<p>Change to Project Folder names under the ConDocs Folder:</p> <p>Change ..\Models\ to ..\BIM_Models\ folder (to identify the BIM model files)</p> <p>Change ..\Sheets\ to ..\CAD_Sheets\ folder (to identify the BIM model files)</p>
2008-04-21	006	Create additional download with revised Icon paths for those who have installed the Bentley XM software to the folder "\Program Files\BentleyXM"

WORKSPACE CHANGES: Folder/File change comparisons between the new release 07Q2 and the new release 07Q3 for MicroStation XM..

PROJECT DRIVE CHANGES: Project drive Folder/File change comparisons between the new release 07Q2 and the new release 07Q3 for MicroStation XM.